Remarks

Claims 1-33 are currently pending and stand rejected. Claim 20 has been amended. Reconsideration of the above-identified application in view of the present amendment and remarks is respectfully requested.

I.   Rejection of Claim 20 under 35 U.S.C. §112

Claim 20 stands rejected under 35 U.S.C. §112 ¶2 as indefinite due to use of the term "desired feature." Applicants disagree that one skilled in the art would be unable to determine features that would be desirable for comparing each of a selected subset of new head candidates to a previous head candidate, as recited in the claim, but in an effort to advance prosecution of the application, claim 20 has been amended to remove the word "desired." Withdrawal of this rejection is thus respectfully requested.

II.   Rejection of Claims 1-33 under 35 U.S.C. §102(e)

Claims 1-33 have been rejected as clearly anticipated under 35 U.S.C. §102(e) by U.S. Patent Publication No. 2004/0240706 to Wallace et al. (hereinafter, "Wallace") without further comment. It is respectfully submitted that all of claims 1-33, either directly or through dependence on another claim, recite in some manner the prediction of the current position of a given tracked head candidate and the selection of a subset of possible new head candidates according to their distance from the predicted position. Wallace uses a previous head position to eliminate head candidates that are too far away, but there is no teaching of prediction of the current position of the head and selecting candidates for consideration based on their proximity to that predicted position. Essentially,

Wallace determines one or more head locations and then verifies that they are physically possible for a human head in light of the immediately previous head location, while the claimed system predicts the current location of a head candidate from its past movement and selects possible candidates in the current image representing that head candidate based on their proximity to the predicted location. It is thus respectfully submitted that claims 1-33 define over Wallace, and the withdrawal of this rejection is respectfully requested.

III.   Rejections of Claims 1-5, 11, 12, and 17-19 under 35 U.S.C. §103(a)

Claims 1-5, 11, 12, and 17-19 have been rejected as unpatentable over U.S. Patent No. 6,801,662 to Owechko et al. (hereinafter: "Owechko"), in view of U.S. Patent Publication No. 2004/0153229 to Gokturk et al. (hereinafter, "Gokturk"). It is respectfully submitted that claims 1-5, 11, 12, and 17-19 define over the cited art.

Claim 1 recites an apparatus for tracking at least one head candidate. An image analyzer analyzes an image signal to identify at least one of a plurality of possible new head candidates within an area of interest and provides data related to the identified at least one head candidate. A tracking system stores location information for at least one tracked head candidate. A candidate matcher predicts the current position of a given tracked head candidate and selects a subset of the at least one of the plurality of possible new head candidates according to their distance from the predicted position. The candidate matcher than evaluates the similarity of each member of the selected subset to the tracked candidate to determine if a new head candidate within the selected subset represents a current position of the tracked head candidate.

It is respectfully submitted that Owechko and Gokturk, taken alone or in combination, fail to teach or suggest all of the elements of claim 1. Specifically, Owechko and Gokturk fail to teach or suggest a candidate matcher that predicts the current position of a prior head candidate and selects head candidates according to their distance from the predicted location. The Office Action notes that Owechko fails to provide this teaching, and relies on Gokturk to teach the recited candidate matcher. Gokturk appears to use only the previous position of the head to begin searching for a new head candidate. There is no teaching or suggestion of a prediction, as the word is typically used, but merely an iterative process where the prior result is used to obtain the current result.

It is further submitted that one skilled in the art would not seek to combine Owechko and Gokturk in the manner suggest in the Office Action. Gokturk appears to teach a template matching scheme in which only an area around the previous location of the head candidate is searched for a new head candidate. Accordingly, there is no existing one or more head candidates from which to select a subset in Gokturk as recited in claim 1. The Office Action attempts to get around this by citing an image analyzer from Owechko. It is respectfully submitted, however, that Gokturk already teaches identifying head candidates, but does so solely in the region the previous candidate to save processing resources. One skilled in the art would not seek to modify Gokturk to recognize head candidate throughout the entire image and then select those around the previous image, as it represents a waste of processing resources relative to the existing Gokturk system. It is thus respectfully submitted

that claim 1 defines over the cited art, and it is respectfully requested that the rejection of claim 1 be withdrawn.

Each of claims 2-5, 11, 12, 17, and 18 depend, directly or indirectly, from claim 1, and are allowable for at least the same reasons. It is thus submitted that each of claims 1-5, 11, 12, 17, and 18 define over the cited art, and the withdrawal of the rejection of these claims is respectfully requested. Claim 19 contains similar subject matter to claim 1 and is allowable for at least the reasons given above. It is thus respectfully submitted that claim 19 defines over the cited art, and the withdrawal of the rejection of claim 19 is respectfully requested.

IV.   Rejection of Claims 6-10 under 35 U.S.C. §103(a)

Claims 6-10 have been rejected as unpatentable over Owechko and Gokturk in further view of U.S. Patent Publication No. 2003/0235341 to Gokturk et al. (hereinafter, "Gokturk03"). It is respectfully submitted that claims 6-10 define over the cited art.

Gokturk03, like Gokturk, appears to identify head candidates only in the region around the previous head candidate (e.g., "The initial ellipse model is now searched only in the new search space", Gokturk03, ¶0060), and thus does not teach or suggest the prediction of a new location or selection of existing head candidates around that location that is performed by the candidate matcher recited in claim 1. Accordingly, Gokturk03 does not remedy the deficiencies of Gokturk and Owechko as applied to claim 1 above. Claims 6-10 depend, directly or indirectly, from claim 1 and are allowable for at least the reasons given for the allowance of claim 1. It is thus submitted that claims 6-10 define over the cited art.

Further, claim 8 recites that a confidence value associated with the given tracked candidate is updated according to the position of the selected subset of the identified at least one of a plurality of possible head candidates relative to the at least one threshold distance and the evaluated similarity of identified at least one of a plurality of possible head candidates to the tracked candidate. The Office Action relies on Owechko to provide this teaching, but the cited portion of Owechko merely discusses assigning a confidence value to an occupant class determination. The cited text doesn't even refer to any head tracking in Owechko, and thus could not teach updating the confidence of a head candidate based on its distance from a predicted position. It is thus respectfully submitted that claim 8 defines over the cited art.

V.   Rejection of Claim 13 under 35 U.S.C. §103(a)

Claim 13 has been rejected as unpatentable over Owechko, Gokturk, and Gokturk03 in further view of U.S. Patent 5,973,732 to Guthrie. (hereinafter, "Guthrie"). Claim 13 depends indirectly from claim 1 and is allowable for at least the same reasons. Guthrie does not remedy the deficiencies of Owechko, Gokturk, and Gokturk03 as applied to claim 1. It is respectfully submitted that claim 13 defines over the cited art, and the withdrawal of the rejection of claim 13 is respectfully requested.

VI.   Rejection of Claims 14-16 under 35 U.S.C. §103(a)

Claims 14-16 have been rejected as unpatentable over Owechko, Gokturk, Gokturk03, and Guthrie in further view of U.S. Patent 7,134,688 to Takagi et al. (hereinafter, "Takagi"). Each of claims 14-16 depends indirectly from claim 1 and is

allowable for at least the same reasons. Takagi does not remedy the deficiencies of Owechko, Gokturk, Guthrie, and Gokturk03 as applied to claim 1. It is respectfully submitted that claims 14-16 define over the cited art, and the withdrawal of the rejection of claims 14-16 is respectfully requested.

VII.   Rejection of Claims 20-30, 32 and 33 under 35 U.S.C. §103(a)

Claims 20-30, 32, and 33 have been rejected as unpatentable over Owechko and Gokturk in further view of Gokturk03. It is respectfully submitted that claims 20-30, 32, and 33 define over the cited art.

Claims 20 and 30 recite similar subject matter to claim 1, but include the additional element that the current location of the previous head candidate is predicted according to its previous location and motion. The cited art, specifically Gokturk and Gokturk03, search for new head candidates around the previous location of the head. There is no teaching or suggesting of taking into account the previous motion of the head whatsoever in searching for the new head candidate. Accordingly, claims 20 and 30 define over the cited art for at least the reasons described with respect to claim 1 as well as the reasons described above.

Claim 27 recites an inner threshold distance and an outer threshold distance around the predicted location, where a confidence value associated with a selected new head candidate is compared to a threshold value only if the selected new head candidate falls between the inner threshold distance and the outer threshold distance. There is no discussion in the cited art of comparing a confidence value associated with the head candidate to a threshold value when the head is in a certain location. The Examiner cites a portion of Gokturk03 citing a range of widths

for a search space, but it will be appreciated that the cited portion of Gokturk03 merely describes a single search space with a width of between of 10-100 pixels. There is no teaching or suggestion of two threshold values, and there is nothing in the cited portion whatsoever about comparing a confidence value associated with a head candidate to a threshold confidence value only when the head candidate falls between two threshold distances from a given location.

Each of claims 21-29 and 32-33 depend, directly or indirectly, from one of claims 20 and 30 and are allowable for at least the same reasons. It is thus submitted that claims 20-30 and 32-33 define over the cited art, and the withdrawal of this rejection is respectfully requested.

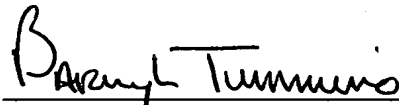## VIII. Rejection of Claim 31 under 35 U.S.C. §103(a)

Claim 31 has been rejected as unpatentable over Owechko, Gokturk, and Gokturk03 in further view of Guthrie. Claim 30 depends from claim 30 and is allowable for at least the reasons given in the discussion of claim 30. Guthrie does not remedy the various deficiencies of Owechko, Gokturk, and Gokturk03 as applied to claim 30. It is thus submitted that claim 31 defines over the cited art, and the withdrawal of this rejection is respectfully requested.

IX. Conclusion

In light of the amendment and remarks above, it is respectfully submitted that claims 1-33 define over the cited art. The withdrawal of the rejections of these claims and the passage of the application to issue is respectfully requested.

Please charge any deficiency or credit any overpayment in the fees for this

matter to our Deposit Account No. 20-0090.

Respectfully submitted,

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